

**Precision feeler gage,  
calibrated shim steel and  
Specialty Spring Steels**

**2011**

**h+s**



### Your partner for precision steels

We offer an extensive range of precision feeler gages and shim steel which covers most product and application needs. All products can be supplied quickly and reliably from our large stock, small quantities as well as bulk quantities.

For products not shown in our range please contact our special order service.

Laser cut shims can be manufactured according to your drawings or CAD-files in all available thicknesses between 0.01 and 5.00 mm.

### Rolled to precise thickness tolerances

The thickness tolerance of h+s precision shim foil meets the international Standard T3 (stainless steel in width 12.7 mm and 600/1000 mm according to DIN EN 9445).

These tolerances are even closer than required by DIN EN 10 140 and EN 9445. The table on page 10 gives information on absolute permissible deviation from thickness.

### High tensile strength due to high quality alloys

Our precision products are manufactured of High Carbon Steels 1.1274 (1095) and 1.2003 (1075), hardened stainless steels 1.4031Mo and 1.4034 (similar to AISI 420), temper rolled stainless steels 1.4310 (AISI 301) and 1.4404 (AISI 316L) and brass (UNS 27 200). These alloys were carefully selected to obtain a high tensile strength.

These alloys are also suitable for flat springs. Information on the strength and hardness is given on page 10 and 11.

### More than 700 products available from stock

A close contact to our customers leads to regular enlargement of our stock. The alloys 1.4031Mo and 1.4404 as well as heat resistant alloys are new in our product program. More than 70 different thicknesses from 0.003 (0.00012") to 5.03 mm (0.198") are available in the following manner:

- up to 0.06 mm in steps of 0.005 mm
- up to 0.30 mm in steps of 0.01 mm
- up to 1.00 mm in steps of 0.05 mm
- up to 2.00 mm in steps of 0.10 mm
- up to 5.03 mm in steps of 0.50 mm
- individual thicknesses are available by flat grinding in thicknesses between 1.00 and 8.0 mm





### Quality inspection

- During manufacturing continuous inspection ensures our close tolerances are met all times
- Product information and product batch are marked on the label. The material can be traced back to the cast. In addition most strips and flat sheets are marked with thickness and production batch.

### Individual sizes according to your needs

Strips and flat sheets can be supplied in all widths up to 300 mm (partly up to 600 mm) in carbon steel, stainless steels and brass. Should you require a product not shown in our range please contact our special order service. Due to our expertise and long-term relationship to our suppliers we can meet your special requirements for non standard products.

### Laser cut parts made from precision shim steel

We offer a service to supply products manufactured from precision foils. Laser cut parts can be manufactured to your drawings or CAD-files. Parts can be supplied in all alloys from 0.01 to approx. 8.0 mm thickness. Flat grinding and laser marking of the parts can be offered as well. Examples are shown on page 9.

### Competitive prices for precision high quality products

Compare our products! Our precision foils offer a good value at high quality and precision. Please ask for availability and special price if you need a larger amount in one size.





# PRECISION FEELER GAGE STOCK

Prices in Euro per box or meter.

- C-Steel W.-Nr. 1.1274
- CrNi-Steel W.-Nr. 1.4310
- Brass W.-Nr. 2.0321
- CrMo-Steel W.-Nr. 1.4031Mo
- CrNiMo-Steel W.-Nr. 1.4404
- Heat resistant steels

Quant.:	1 m	2 m	5 m	10 m	5 m	5 m	5 m	1 m	5 m	5 m	5 m	5 m	5 m	5 m	1 m	
Width:	12,7	12,7	12,7	12,7	6	25	50	300-305	10	12,7	25	50	100	150	300-305	
Thick-ness:	C-Steel 1.1274	C-Steel 1.1274	C-Steel 1.1274	C-Steel 1.1274	C-Steel 1.1274	C-Steel 1.1274	C-Steel 1.1274	C-Steel 1.1274	CrNi-Steel 1.4310	CrNi-Steel 1.4310	CrNi-Steel 1.4310	CrNi-Steel 1.4310	CrNi-Steel 1.4310	CrNi-Steel 1.4310	CrNi-Steel 1.4310	
0,003													u. request	u. request		
0,005	• (5)	• (5)	• (5)	• (5)						•			•	•		
0,008																
0,01	• (5)	• (5)	• (5)	• (5)		• (5)	• (5)			•	•	•	•		• (2)	
0,015																
0,02	•	•	•	•		• (5)	• (5)			•	•	•	•		• (2)	
0,025														•	•	
0,03	•	•	•	•		•	•			•		•	•		•	
0,035																
0,04	•	•	•	•		•	•			•		•	•		•	
0,045																
0,05	•	•	•	•	•	•	•	• (1)	•	•	•	•	•	•	•	•
0,055																
0,06	•	•	•	•		•	•	• (1)		•		•	•		•	•
0,07	•	•	•	•		•	•	• (1)		•		•	•		•	•
0,075															•	•
0,08	•	•	•	•	•	•	•	• (1)		•		•	•		•	•
0,09	•	•	•	•		•	•	• (1)		•		•	•		•	•
0,10	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
0,11										•		•	•		•	•
0,12	•	•	•	•	•		•	• (2)		•		•	•		•	•
0,13										•		•	•		•	•
0,14										•		•	•		•	•
0,15	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
0,16										•		•	•		•	•
0,17										•		•	•		•	•
0,18	•	•	•	•	•		•	• (2)		•		•	•		•	•
0,19										•		•	•		•	•
0,20	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
0,21										•		•	•		•	•
0,22										•		•	•		•	•
0,23										•		•	•		•	•
0,24										•		•	•		•	•
0,25	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
0,26										•		•	•		•	•
0,27										•		•	•		•	•
0,28										•		•	•		•	•
0,29										•		•	•		•	•
0,30	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
0,35	•	•	•	•		•	•	•	•	•	•	•	•	•	•	•
0,40	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
0,45	•	•	•	•		•	•	•	•	•	•	•	•	•	•	•
0,50	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
0,55	•	•	•	•		•	•	•	•	•	•	•	•	•	•	•
0,60	•	•	•	•		•	•	•	•	•	•	•	•	•	•	•
0,65	•	•	•	•						•		•	•		•	•
0,70	•	•	•	•		•	•	•	•	•	•	•	•	•	•	•
0,75	•	•	•	•				u. request		•		•	•		•	•
0,80	•	•	•	•		•	•	•	•	•	•	•	•	•	•	•
0,85	•	•	•	•						•		•	•		•	•
0,90	•	•	•	•		•	•	•	•	•	•	•	•	•	•	•
0,95	•	•	•	•						•		•	•		•	•
1,00	•	•	•	•		•	•	•	•	•	•	•	•	•	•	•
1,10	•	• (4)	• (4)	• (4)												
1,20	•	• (4)	• (4)	• (4)												
1,30	•	• (4)	• (4)	• (4)												
1,40	•	• (4)	• (4)	• (4)												
1,50	•	• (4)	• (4)	• (4)												
1,60	•	• (4)	• (4)	• (4)												
1,70	•	• (4)	• (4)	• (4)												
1,80	•	• (4)	• (4)	• (4)												
1,90	•	• (4)	• (4)	• (4)												
2,00	•	• (4)	• (4)	• (4)												

(1) = differing width 100-150 mm  
 (2) = differing width 200-205 mm  
 (3) = Upon request also available in width 305 mm  
 (4) = available only in length 1000 mm  
 (5) = available only in the alloy 1.4310 (AISI 301)  
 (6) = also available in length 2000 mm





# FLAT SHEETS

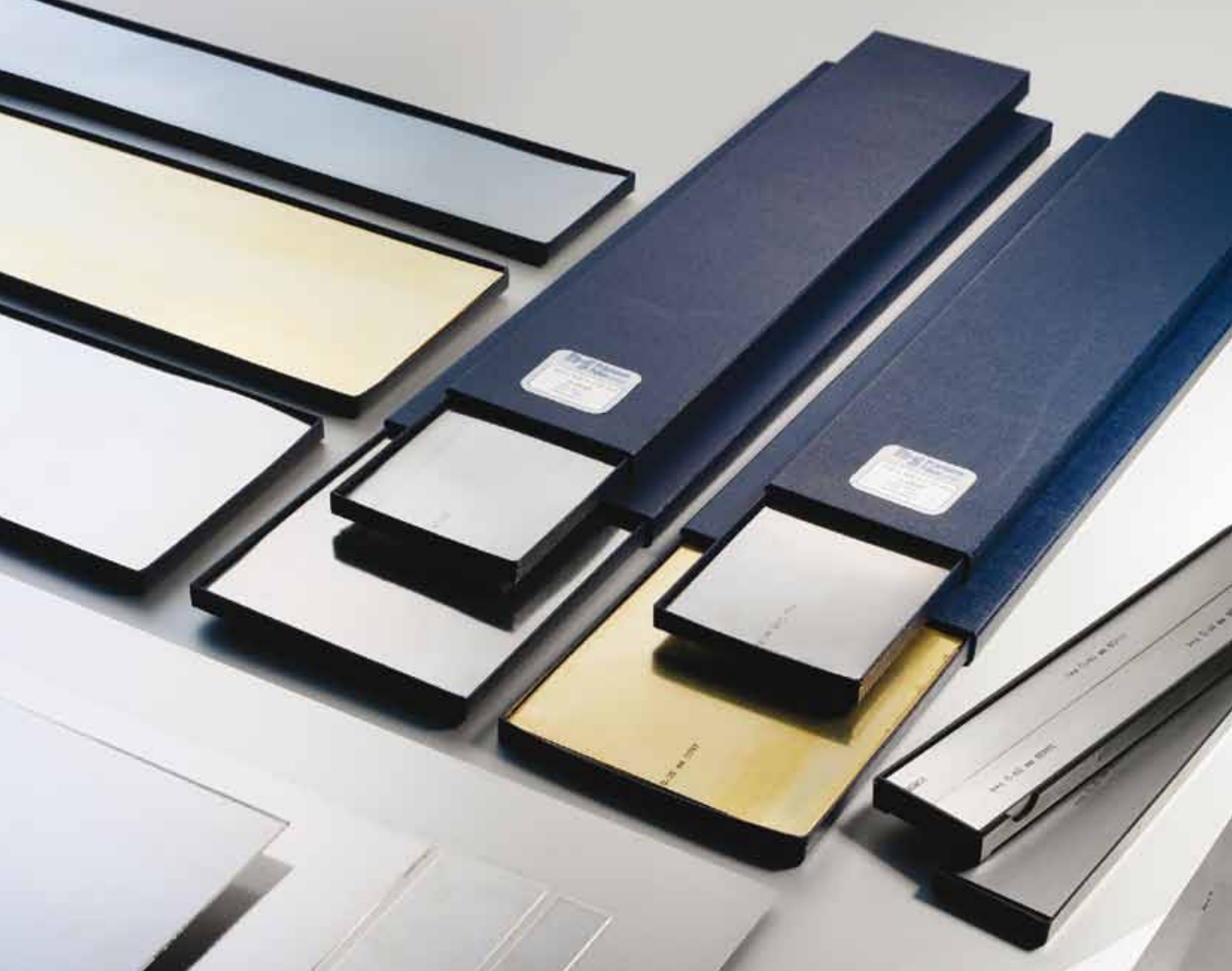
Prices in Euro per package or piece

C-Steel W.-Nr. 1.1274  
 CrNi-Steel W.-Nr. 1.4310

C-Steel W.-Nr. 1.2003  
 Brass W.-Nr. 2.0321

Cr-Steel W.-Nr. 1.4034  
 Not available

Quant.:	1 Piece	10 Pieces	10 Pieces	1 Piece	1 Piece	5 Pieces	5 Pieces	1 Piece	1 Piece	1 Piece	5 Pieces
Size:	300 x 1000	25 x 300	50 x 300	350 x 1000	360 x 1000	100 x 500	150 x 500	250 x 1000	305 x 1000	600 x 1000	150 x 500
Thickness:	1.1248 soft	C-Steel 1.1274	C-Steel 1.1274	C-Steel 1.2003	Cr-Steel 1.4034	CrNi-Steel 1.4310	CrNi-Steel 1.4310	CrNi-Steel 1.4310	CrNi-Steel 1.4310	CrNi-Steel 1.4310	Brass 2.0321
0,01		• (5)	• (5)			•					•
0,015						•					•
0,02		• (5)	• (5)			•					•
0,025							•				•
0,03		•	•			•					•
0,035						•					•
0,04		•	•			•					•
0,045						•					•
0,05		•	•			•	•				•
0,055						•					•
0,06		•	•			•					•
0,07		•	•			•					•
0,075							•				•
0,08		•	•			•					•
0,09		•	•			•					•
0,10		•	•			•	•				•
0,11						•					•
0,12			•			•					•
0,13						•					•
0,14						•					•
0,15		•	•			•	•		•	•	•
0,16						•					•
0,17						•					•
0,18			•			•			•	•	•
0,19						•					•
0,20	•	•	•			•	•		•	•	•
0,21						•			•		•
0,22						•			•		•
0,23						•			•		•
0,24						•			•		•
0,25		•	•			•	•	• (7)	•	•	•
0,26						•			•		•
0,27						•			•		•
0,28						•			•		•
0,29						•			•		•
0,30	•	•	•			•	•	• (7)	•	•	•
0,35			•			•			•		•
0,40	•	•	•			•	•		•	•	•
0,45			•			•			•		•
0,50	•	•	•			•	•		•	•	•
0,55						•		• (7)			•
0,60		•	•			•	•		•	•	•
0,65						•					•
0,70	•	•	•			•	•	• (7)	•	•	•
0,75						•		• (7)			•
0,80	•	•	•			•	•		•	•	•
0,85						•			•		•
0,90		•	•			•	•		•		•
0,95						•			•		•
1,00	•	•	•	•	• (6)	•	•		•	•	•
1,10					• (6)	•		• (7)			•
1,20		u. request	u. request	•	• (6)	•	•		• (6)		•
1,30					• (6)	•					•
1,40					• (6)	•					•
1,50	•	u. request	u. request	•	• (6)	•	•		• (6)		•
1,60					• (6)	•					•
1,70					• (6)	•					•
1,80		u. request	u. request	•	• (6)	•	•	• (7)			•
1,90					• (6)	•	•	• (7)			•
2,00	•	u. request	u. request	•	• (6)	•	•		• (6)		•
2,20				u. request							•
2,40				u. request							•
2,50		u. request	u. request	•	• (6)			• (2)			•
2,60				u. request							•
2,80				u. request							•
3,00		u. request	u. request	•	• (6)			• (6)			•
3,20				u. request							•
3,50				u. request							•
3,80				u. request							•
4,00		u. request	u. request	•	u. request						•
5,03		u. request	u. request	•	u. request						•



## ASSORTMENTS

Item	Size in mm	Sheets	Contents: 1 Sheet	Euro
Assortment 25 - C-Steel	25 x 300	21	0,01 - 1,00 mm	•
Assortment 50/1 - C-Steel	50 x 300	25	0,01 - 1,00 mm	•
Assortment 50/2 - C-Steel	50 x 300	23	like 50/1 without 0,01/0,02 mm	•
Assortment 50/3 - C-Steel	50 x 300	11	0,02/0,03/0,05/0,10/0,15/0,20/0,25/0,30/0,40/ 0,50/1,00 mm	•
Assortment 100/1 - Stainless	100 x 500	9	0,02/0,05/0,10/0,15/0,20/0,30/0,40/0,50/ 1,00 mm	•
Assortment 100/2 - Stainless	100 x 500	11	0,02/0,05/0,10/0,15/0,20/0,25/0,30/0,35/0,40/ 0,45/0,50 mm	•
Assortment 100/3 - Stainless	100 x 500	11	0,50/0,55/0,60/0,65/0,70/0,75/0,80/0,85/0,90/ 0,95/1,00 mm	•
Assortment 150 - Stainless	150 x 500	10	0,025 - 0,50 mm	•
Assortment 150 Brass	150 x 500	10	0,025 - 0,50 mm	•

- (1) = differing width 100-150 mm  
 (2) = differing width 200-205 mm  
 (3) = Upon request also available in width 305 mm  
 (4) = available only in length 1000 mm  
 (5) = available only in the alloy 1.4310 (AISI 301)  
 (6) = also available in length 2000 mm  
 (7) = As long as supplies last



## SLITTING

The precision strips can be slit to your requested width. Carbon steels and brass are available up to 300 mm width, stainless steel 1.4310 (AISI 301) is available up to 300 mm, from new production also up to a width of 600 mm. Rounded or deburred edges are available upon request. The minimum length is 50 meters depending on availability, thicknesses above 0.80 mm are also available in shorter lengths. The strips can be applied with self-adhesive strips or cut-to-length. Packaging in plastic or tin boxes is also available.

## CUTTING-TO-LENGTH

Strips in widths up to 305 mm can be cut to individual lengths at narrow length tolerances by the help of an electronic roll feeder. In the thickness range of 0.40 to 1.00 mm the sheets can be leveled by a precision leveler. Sheets in thicknesses between 1.1 and 3.0 mm can be cut by a special spring steel shear.

## LASER CUTTING

With specialized equipment we can supply small quantities of laser cut pieces reliably and cost-saving:

- delicate parts can be manufactured by YAG-lasers in a thickness range from 0,01 to 2,0 mm at tolerances of +/- 0,05 mm.
- At thicknesses from 0.50 mm the pieces can be cut by CO<sub>2</sub>-Lasers at tolerances of +/- 0,10 mm.

A wide inventory of different spring steels enables the manufacturing of samples for tests in different tensile strengths and alloys. Very long pieces up to approx. 6000 mm length can be manufactured from coil material.

In selected thicknesses Molybdenum and Titanium are available for laser cut pieces.

## LASER MARKING

Parts can be marked permanently by laser with the part number or thickness. Laser marking has a much better quality than embossing, engraving or etching and enables small lots as small as 1 piece.

## FLAT GRINDING

Individual thicknesses or very narrow thickness tolerances of +/- 0.01 mm can be achieved by flat grinding up to a size of 300x600 mm (larger sizes upon request). Many different thicknesses are available in the hardened tool steel 1.2003 and stainless tool steel 1.4034 to avoid high grinding costs.

The alloy 1.4310 (AISI 301) can not be fixed on grinding machines due to a low magnetizability. In addition to the strip hardened material also piece hardened sheets are available in the alloy 1.4034 from 3.0 to approx. 8.0 mm thickness. These parts need to be ground to the exact thickness due to technical reasons.

## APPLICATION OF SELF-ADHESIVE STRIPS

Feeler gauge strips in stainless steel and brass can be applied with self-adhesive strips in variable widths up to 150 mm. Several qualities of self-adhesive strips are available for different operational environment. The minimum length is 50 or 100 meter depending on the quality of the self-adhesive strip. The strips can be cut to your required length upon request.



## EXAMPLES OF USE

Due to the high tensile strength of our strip steels Laser cutting is an ideal method to manufacture precise parts.

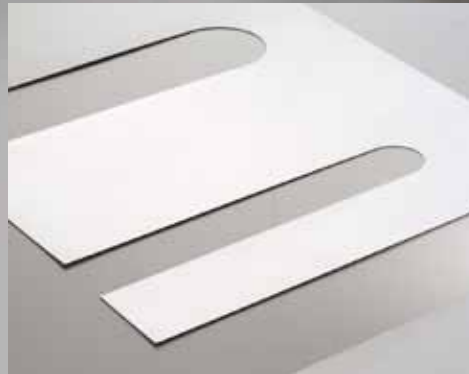
With our equipment we are able to offer a service for individual parts in small batches like:



- Feeler gage blades and adjustment gages in many different thicknesses



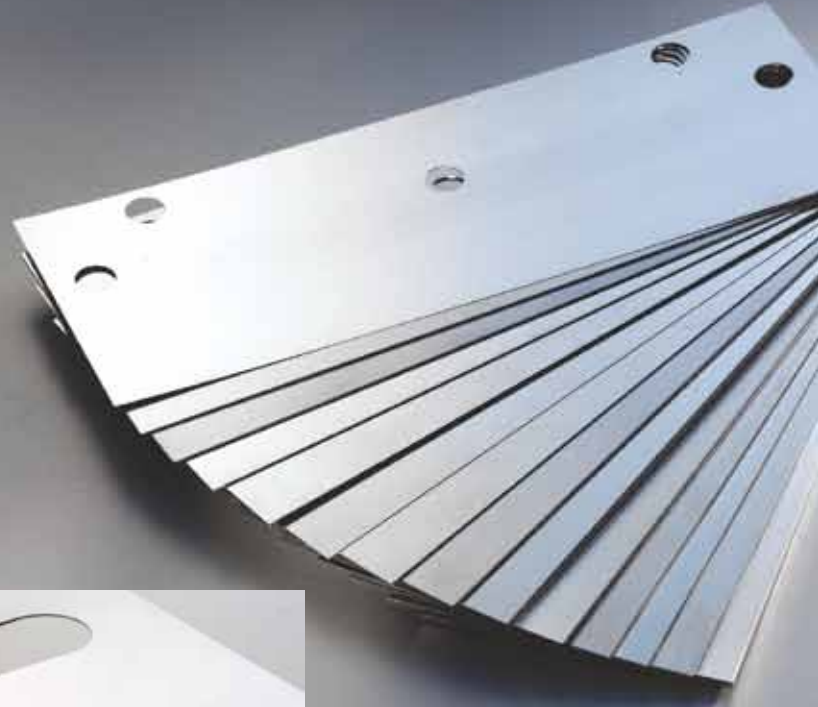
- Shim foils to adjust measuring devices in micrometer range from 0.01 to 0.075 mm
- Shims from 0.10 to 0.30 mm for the assembling of tool machines



- Shims up-to 4000 mm length and 0.10 to 5.00 mm thickness to set up heavy machines



- Discs made from spring steel with 600 mm diameter
- Springs, fixtures and machine parts of higher strength and wear resistance



- Assortments of shims for die manufacturing from 0.10 to 2.0 mm thickness

Laser cut parts can be cut from precision foils as thin as 0.01 mm. Between a thickness of 0.05 and 1.00 stainless steel parts can be delivered up-to 600 mm wide, in the thickness range between 0.10 and 0.50 mm even 1000 mm wide stainless steel is available. Hardened and tempered carbon steel is a low-cost alternative to stainless steel in the thicknesses from 0.05 to 5.03 mm. Carbon spring steel 1.1274 (C100S) in thicknesses from 0.05 to 1.00 mm and hardened tool steel 1.2003 (75Cr1) in thicknesses from 1.00 to 5.03 mm are a low-cost alternative to stainless steels. At high demands for flatness or hardness the stainless, hardened steels 1.4031Mo and 1.4034 are available in thicknesses from 0.20 to 3.00 mm. Piece hardened sheets are available in the alloy 1.4034 from 3.0 to approx. 8.0 mm thickness. These parts need to be ground to the exact thickness due to technical reasons.

In selected thicknesses also Molybdenum and Titanium are available for laser cut parts.



# THICKNESS TOLERANCES AND TENSILE STRENGTHS

Thickness tolerances:

Thickn.:	Tolerance T3	Tolerance T3	EN 9445	EN 9445
	Upto 305 mm	320-400 mm	Tab 1	Tab. 1
	+/- mm	+/- mm	12,7 mm	600 mm
	+/- mm	+/- mm	+/- mm	+/- mm
0,003	0,001			
0,005	0,001		0,001 (T3)	
0,008	0,002			
0,010	0,002		0,002 (T3)	
0,015	0,002			
0,020	0,002		0,002 (T3)	
0,025	0,002			
0,030	0,003		0,0023 (T2)	
0,035	0,003			
0,040	0,003		0,002 (T3)	
0,045	0,003			
0,050	0,003		0,003 (T3)	0,008
0,055	0,003			
0,060	0,003		0,003 (T3)	
0,070	0,004		0,004 (T3)	
0,075	0,004			
0,080	0,004		0,004 (T3)	
0,090	0,004		0,004 (T3)	
0,10	0,004		0,004 (T3)	0,010
0,11	0,004		0,004 (T3)	
0,12	0,004		0,004 (T3)	
0,13	0,005		0,005 (T3)	
0,14	0,005		0,005 (T3)	
0,15	0,005		0,005 (T3)	0,012
0,16	0,005		0,005 (T3)	
0,17	0,005		0,005 (T3)	
0,18	0,005		0,008 (P)	0,012
0,19	0,005		0,005 (T3)	
0,20	0,006		0,006 (T3)	0,012
0,21	0,006		0,006 (T3)	
0,22	0,008		0,006 (T3)	
0,23	0,008		0,008 (P)	
0,24	0,006		0,007 (T3)	
0,25	0,007		0,007 (T3)	0,015
0,26	0,007		0,007 (T3)	
0,27	0,009		0,007 (T3)	
0,28	0,009		0,007 (T3)	
0,29	0,007		0,007 (T3)	
0,30	0,007		0,007 (T3)	0,015
0,35	0,008		0,008 (T3)	
0,40	0,009		0,012 (P)	0,018
0,45	0,009			
0,50	0,010		0,010 (T3)	0,020
0,55	0,010			
0,60	0,010		0,015 (P)	0,025
0,65	0,012			
0,70	0,012		0,015 (P)	0,025
0,75	0,012			
0,80	0,013		0,015 (P)	0,025
0,85	0,013			
0,90	0,013		0,015 (P)	
0,95	0,013			
1,00	0,013	0,018	0,020 (P)	0,030
1,10	0,017	0,018		
1,20	0,017	0,018		
1,30	0,020	0,022		
1,40	0,020	0,022		
1,50	0,020	0,022		
1,60	0,023	0,026		
1,70	0,023	0,026		
1,80	0,023	0,026		
1,90	0,023	0,026		
2,00	0,023	0,028		
2,20				
2,40				
2,50		0,030		
2,60				
2,80				
3,00		0,030		
3,20				
3,50		0,034		
4,00		0,034		
5,03		0,040		
5,0-8,0				

Tensile strengths and hardness values:

C-Steel	C-Steel	CrMo-Steel	Cr-Steel	CrNi-Steel	CrNiMo-Steel
1.1274	1.2003	1.4031Mo	1.4034	1.4310	1.4404
hardened	Hardened	Hardened	Hardened	10-205 mm	Annealed
				ca. 1500	
				ca. 1500	
2000-2200				ca. 1000	
				> 1500	
2000-2200				> 1500	
				15-1700	
2000-2200				15-1700	
				15-1700	
2000-2200				15-1700	
				15-1700	500-800
2000-2200				15-1700	
				15-1700	
2000-2200				15-1700	
		1700-1950		15-1700	
2000-2200				15-1700	
				15-1700	500-800
2000-2200		1700-1950		15-1700	
				15-1700	
				15-1700	
2000-2200				15-1700	500-800
				15-1700	
				15-1700	
1800-2100				15-1700	
				15-1700	
1800-2100		1700-1950		15-1700	500-800
				15-1700	
				15-1700	
1800-2100		1700-1950		15-1700	500-800
				15-1700	
				15-1700	
				15-1700	
1800-2000		1700-1950		15-1700	500-800
1800-2000				15-1700	
1600-1900		1700-1950		15-1700	500-800
1600-1900				15-1700	
1600-1900		1700-1950		15-1700	500-800
1600-1900				15-1700	
1600-1900				15-1700	
1600-1900				15-1700	
1600-1800		1700-1950		15-1700	500-800
1600-1800				15-1700	
1600-1800				15-1700	
1600-1800	48-50 HRC		50-52 HRC	15-1700	500-800
1400-1600			50-52 HRC	15-1700	
1400-1600	48-50 HRC		50-52 HRC	15-1700	
1400-1600			50-52 HRC	13-1500	
1400-1600			50-52 HRC	13-1500	
1400-1600	48-50 HRC		50-52 HRC	13-1500	
1400-1600			50-52 HRC	13-1500	
1400-1600	48-50 HRC		50-52 HRC	13-1500	
1400-1600			50-52 HRC	13-1500	
1400-1600	48-50 HRC		50-52 HRC	13-1500	
	48-50 HRC		50-52 HRC		
	48-50 HRC		50-52 HRC		
	48-50 HRC		50-54 HRC		
	48-50 HRC		50-54 HRC		
	48-50 HRC		50-54 HRC		
			50-54 HRC		



## SPECIAL-STRENGTHS Alloy 1.4310

CrNiMo-Steel	Brass	CrNi-Steel				
1.4404	2.0321	1.4310				
Hard	Hard	Thickn.:	11-1300	13-1500	15-1700	19-2100
		0,003				
		0,005				
		0,008				
>1100	>540	0,010				
		0,015				
>1100	>610	0,020				
	>540	0,025			305*	
	>540	0,030		305*		
		0,035				
	>540	0,040		305*		
		0,045				
11-1300	>540	0,050	105	300*+600	305*	
		0,055				
		0,060			305*	
		0,070			305*	
	550-640	0,075			305*	
		0,080			305*	
		0,090			305*	
11-1500	>540	0,10	300	300 + 1000	305*+610	300
		0,11			305*	
		0,12			305*	
		0,13			305*	
		0,14			305*	
11-1300	480-560	0,15	300	ca. 300	305*+610	300
		0,16			305*	
		0,17			305*	
		0,18			305*	
		0,19			305*	
11-1300	550-640	0,20	300+600	300+690	305*+610	300
		0,21			305*	
		0,22			300	
		0,23			100	
		0,24			305*	
	480-560	0,25	300	300	305*+610	
		0,26			305*	
		0,27			300	
		0,28			300	
		0,29			305*	
11-1300	550-640	0,30	300+600	300+620	305*+610	300
		0,35			305*	
	550-640	0,40	300+600	300+620	305*+610	
		0,45			305*	
11-1300	550-640	0,50	300+600	300+620	305*+610	
		0,55			250*	
	>630	0,60	300		305*+610	
		0,65			250*	
	370-440	0,70			305*+610	
		0,75			250*	
	550-640	0,80	600x1000		305*+610	
		0,85			305*	
	550-640	0,90			305*	
		0,95			305*	
	550-640	1,00	600x1000		305*+610	
		1,10			250x1000*	
		1,20	300x2000		150x500*	
		1,30		100x500*		
		1,40		100x500*		
		1,50	300x2000	150x500*		
		1,60		100x500*		
		1,70		100x500*		
		1,80		150x500*		
		1,90		100x500*		
		2,00	300x2000	150x500*		
		2,20				
		2,40				
		2,50	200x1000			
		2,60				
		2,80				
		3,00	250x1000			

\* Thickness tolerances T3  
All other sizes DIN EN 9445

## MATERIAL INFORMATION

### Hardened and tempered High Carbon Steel 1.1274 C100S (1095)

Composition: C: max. 1,05 %, Si: 0,15-0,30%, Mn: 0,30-0,45%, P: max. 0,02%, S: max. 0,02%, Cr: approx. 0,01% Condition: hardened and tempered, white polished. Flatness max. 0.3% of the strip width, Edges: width 6,0 and 12,7 mm have rounded edges at thicknesses of more than 0.25 mm, all other sizes cut edges.

Due to a carbon content of more than 1% this alloy is ideal for feeler gauge stock, shims and springs where corrosion problems are not expected. Sheets in the unhardened condition are available in the alloy 1.1248 (1075) at a tensile strength of 490-650 N/mm<sup>2</sup>.

### Hardened Tool Steel W.-Nr. 1.2003 – 75Cr1 – AISI 1075

Composition: C: 0,70-0,80%, Si: 0,25-0,50%, Mn: 0,60-0,80%, P: max. 0,03%, S: max. 0,03%, Cr: 0,30-0,40% Condition: hardened and tempered, unpolished. Flatness max. 0.2% of the strip width, cut edges.

A small amount of Chromium leads to a higher wear resistance and better hardening for large widths. This alloy is also suitable for small tools due to a Rockwell hardness of 47-51 HRC.

### Hardened and tempered Special Spring Steel 1.4031Mo – X39CrMo14 – (AISI 420)

Composition: C: approx. 0,39%, Si: approx. 0,40%, Mn: approx. 0,60%, P: max. 0,025%, S: max. 0,010%, Cr: approx. 13,5%, Mo approx. 1,0% Condition: hardened and tempered. Flatness P2, some thicknesses also P3, cut edges.

Due to the content of 13% Chromium and 1% Molybdenum this alloy is corrosion resistant at wet air, steam and water, but not resistant enough against chloride ions and acids. The alloy 1.4031Mo has advantages in better wear resistance and low inner stress. With a tensile strength of 1700-1950 N/mm<sup>2</sup> this alloy is used for springs, gauges, small tools and knives.

### Hardened and tempered Stainless Tool Steel W.-Nr. 1.4034 - X46Cr13 – (AISI 420)

Composition: C: approx. 0,46%, Si: max. 1,00%, Mn: max. 1,00%, P: max. 0,04%, S: max. 0,03%, Cr: 12,5-14,5% Condition: hardened and tempered, brush polished. Flatness 0,20% of the strip width, cut edges.

Due to the content of 13% Chromium this steel is corrosion resistant at wet air, steam and water, but not resistant against chloride ions and acids. The alloy 1.4034 has advantages in better wear resistance and low inner stress compared to temper rolled stainless steels like 1.4310 (AISI 301), but a lower corrosion resistance. With a hardness of 50-52 HRC this alloy is used for gauges, small tools and knives. The alloys 1.4034 and 1.2083 only differ minimal in the content of Carbon.

### Temper rolled Stainless Spring Steel W.-Nr. 1.4310 – X10CrNi 18-8 – AISI 301

Composition: C: 0,05-0,15%, Si: max. 2,00%, Mn: max. 2,00%, P: max. 0,045%, S: max. 0,015%, Cr: 16-19%, Ni: 6-9,5%, Mo: max. 0,80% Condition: temper rolled, surface 2H, wave height max. 1,0 mm, cut edges.

The alloy 1.4310 (AISI 301) has a good corrosion resistance due to a content of 17% Chromium and 7% Nickel. A high tensile strength is obtained by cold rolling. Compared to alloy 1.4301 (AISI 304) a much higher tensile strength of more than 2000 N/mm<sup>2</sup> can be reached. Because of this, the alloy 1.4310 is suitable for stainless feeler gage stock, precision foils, stainless springs and parts of higher strength.

### Temper rolled Stainless Spring Steel

#### Annealed Stainless Steel

#### W.-Nr. 1.4404 – X3CrNiMo 17-12-2 – AISI 316L

Composition: C: max. 0,03%, Si: max. 2,00%, Mn: max. 2,00%, P: max. 0,045%, S: max. 0,015%, Cr: 16-19%, Ni: 10-12%, Mo: 2,0-2,5% Condition: in temper rolled condition surface 2H, flatness according to EN 9445, cut edges in annealed condition surface 2B or 2R, flatness according to EN 9445, cut edges.

The alloy 1.4404 (AISI 316L) has a very good corrosion resistance due to a content of 2.0 to 2.5% and a heightened content of more than 10% Nickel. It is suitable for many applications in the food industry and also for the environmental and medical industry.

#### Temper rolled Brass W.-Nr. 2.0321 CuZn37

Composition: Cu: 62,0-65,5%, Zn: balance, Ni: max. 0,30%, Pb: max. 0,10%, Fe: max. 0,10%, Sn: max. 0,10%, Al: max. 0,10%, Others: max. 0,10% Condition: hard or full-hard, Flatness according to DIN 1791, cut edges.

This brass is the standard alloy for temper rolled brass. It can be used for springs, connectors and stamped parts.

#### Heat resistant Stainless Steels W.-Nr. 1.4767 – 1.4828 – 1.4841

In the thicknesses 0.05 and 0.11 the ferritic steel 1.4767 is on stock. Austenitic Steels 1.4828 or 1.4841 are available in the thicknesses 0.05 – 0.15 – 0.20 – 0.25 and 0.30 mm. Detailed information on these alloys are available upon request.

Low carbon steels like DC01 (1.0330) and stainless steels like 1.4301 are also available from special production.

Please ask for availability and price if you need these or similar alloys.

Laser cut parts can be made from Molybdenum and Titanium in selected thicknesses.

